climate change : issues and perceptions

Report
Climate Change Roundtable
30th October-2008, Bhubaneswar

Organised by FCFC, INECC, ODAF and DHARA

11681
CHC-CLIC

foreword....

It is a privilege to share with you the compilation of the proceedings of the regional round table consultation on 'climate change - community perceptions and responses' that was held at Bhubaneswar on the 30th October 2008, organised collectively by Forum of Collective Forms of Cooperation, Indian Network on Ethics and Climate Change, Orissa Development Action Forum and DHARA. The outcome of this consultation was an eye opener to many of the delegates and participants to understand the direct experiences of the impact of climate change supported by research and academic inputs. The consultation also created a critical debate on the current model of dominant development pursued by the Governments. The critics were prophetic about what would happen if we continue business as usual, therefore why it was important to look into alternatives to macro economic models that accelerates climate change. Community representatives shared their efforts of building life giving economies rather than life killing economies. Community voices in the consultation sent signals to the rich and the upper middle class living in the north as well as in the southern countries to change their life styles based on luxury emissions causing misery to the majority, and urged that change was imperative in lifestyles of the minority to bring in change in the climate as well enabling the poor to lead a simple life. The voices of this regional consultation were to be shared during a National consultation organised by Forum of Collective Forms of Cooperation and Indian Network on Ethics and Climate Change.

We thank all the members to who got themselves associated in this regional consultation and especially to the organisers, speakers and finally to the documentation team who managed to put all the inputs into a documentation that you have now with you. Trust the outcome will help all of us to sharpen our understanding on climate change and its implication and plan to address the issues relating to aware ology transfer and the required financial a in combating climate change implic necessary policy changes in differe communities through local, State, re networking and bringing out people contribute to climate change – a lo

William Stanley,
Executive Secretary, ODAF

SOCHARA
Community Health
Library and Information Centre (CLIC)
Community Health Cell
85/2, 1st Main, Maruthi Nagar,
Madiwala, Bengaluru - 560 068.
Tel : 080 - 25531518
email : clic@sochara.org / chc@sochara.org
www.sochara.org

Climate Change Roundtable Bhubaneswar

Facilitation team:

Mr. Santosh Patnaik, ODAF
Mr. Manoj Pradhan, CPSW/ODAF
Ms Jijnaasaa Dash, ODAF
Mr. Ananda Swain, DHARA
Mr. Sanjay Khatua, DHARA

Report and documentation:

Mr. Siddharth Das, ODAF
Mr. Ananda swain, DHARA

Editorial team:

Dr. William Stanley, Convenor, CFC-ER
Mr. Sailesh Chakravarty, National Convenor, FCFC

Reports and materials adapted for publication:

Sanjay khatua

Document devised by:

DHARA, Bhubaneswar

Cover Sketch: Rajendra N. Sahu

Published by:

FCFC & ODAF
NA-204, Neelachakra Apartments,
Cuttack Road
odafbbsr@gmail.com
Bhubeneswar- 751006

climate change : issues and perceptions

Report
Climate Change Roundtable
30th October-2008, Bhubanewsar

Organised by FCFC, INECC, ODAF and DHARA

inside...

summary ... 04
climate change roundtable process ... 08
climate change Orissa overview ... 13
climate change policy perspective & policy choices ... 17
excerpts from thematic presentations ... 24
national action plan on climate change ... 45
blind spots in India's new national action plan on climate change ... 48
the conference of parties (cop) - Rio to Copenhegen ... 56

summary

climate change roundtable- Bhubaneswsar community perceptions and responses

Climate Change: Perceptions

- Prolonged heat wave phenomena (difficulty in doing summer cultivation)
- Winter temperature is gradually increasing, rainfall fluctuation
- Longer span of dry days
- Longer span of summer has resulted in increase in type and intensity of insects/pests
- Rise in temperature; air temperature rising at many urban areas due to industrial growth
- Pattern of vulnerability and risk changing due to increased incidences of flood, cyclone, heat-wave and lightening, etc. in the recent past
- Disaster losses are on the increase, vulnerability of the poor on the increase
- New areas coming under flood and drought. Flood in western Orissa was not common earlier. Non- coastal districts like Sundergarh and Nabarangapur are reporting floods
- Flood and cyclone now affect 93% of the population
- Coastline is changing, new off-shore islands are being formed, increased cases of depression and saline intrusion, crop loss
- Increase in sea level and incidence of high tide, and saline intrusion during high tide
- Socio-economically important trees are flowering early in many pockets (Mango, Mahua f.exp.)

Contributing factors

- Increase in the fossil fuel based industry
- Chemical based agriculture and collateral damage
- Consumerist attitude
- Submerged rice farming and increase in inorganic farming

Critical observations

- The way sea level is rising it may fill up the backwaters turning them part of the sea
- Suspended particulate matters are quite high in most industrial areas (f.exp. Angul-Talcher)
- Number of coal based power plants are in the pipeline (some very close to the cities)
- Need to show concern about the plight of the people rather than commoditization of their plight (carbon credit)
- Recent Bihar floods are caused by global warming (melting of Himalayan glacier - the flood water was unusually cold)
- 29 percent of the geographical area of Orissa is already subject to desertification
- Improper water use is turning about 24 percent land into saline and water logged areas
- Agricultural land is fast decreasing
- Need to track the relationship between the development policy and development risk
- Concern over development does not reduce risk
- Scope to believe that the drive for growth and development generating new disaster risk
- Climate change is a dynamic process but we have to respond to manmade impacts
- We have to do things in a reverse way, we need to give a break and change
- In Orissa, 279 species are in the verge of extinction
- Tough action like introduction of Compressed Natural Gas (CNG) in Delhi is required
- Community based technology with multiple integrated impact (Micro- Hydro) needed
- Identification and plantation of trees for carbon sequestration
- Have to maintain productivity and sustainability- planting of Nitrogen Fixing Trees (NFT) and Multi-Purpose Trees (MPT) and adapt agro-forestry models
- Extensive work needed on mangroves on the flood-planes
- Integrated farming system need to be promoted- crop, tree, water and fish
- Inter-generational equity- leave water, soil as pure and un-polluted
- Watch out for unsustainable agriculture and collateral damage to the environment

- Methane emission is less if organic matter is fed to the livestock
- Organic food production would reduce energy need

Alternatives / adaptations

- Reversing the trend of life style at the family level
- Plantation of multi-purpose trees
- Agro forestry
- Carbon sequestration
- Organic farming
- Community based green technology
- Developing the skills of the community to cope with the Climate Change induced effects
- Developing community based livelihood systems integrating to land, water and forest
- Making the statutory, regulatory bodies accountable
- Making law which works
- Effective media participation

Recommendations

Group-1

- Develop critique on the current models of development where there is no scope for the well being of the community and which destroys the bio-diversity
- Develop sustainable micro-level models and influence policies
- Influence manifesto of the political parties for low-carbon development path
- Develop living based on knowledge systems and ways and means to scale it up
- Scaling up of sustainable community based models already developed
- Space and political will to scale up CDM addressing the communities not the corporate
- Making the local governance support CDM at community level and transform life killing economies to life giving mechanism

Group -2

- Mainstreaming climate change into all developmental work
- Development work along with climate change should be properly addressed and documented and should be done in a vast scale with proper community participation
- Restoration of the traditional coping-up mechanism
- Making the communities aware about the issue
- Climate change should not be a topic only among the intellectuals, it should be clear enough for the common people to understand
- Sensitisation of the media
- Capacity building of the local leaders
- Restoration and preservation of traditional law
- Greater emphasis on organic farming

Group-3

- People-centred process to be initiated
- Greater use of the solar energy and wind energy and other sources of alternatives
- Awareness of the NGOs and the people regarding the climate change/ global warming
- Code of conduct on consumption policies
- People centred climate change policy
- Importance on micro projects/industry than mega projects
- Affected peoples' voice should be heard and represented in different countries
- Change in life style

welcome

I have the privilege to welcome you all to today's consultation. Since more than one decade, climate change has become part of our life. It is a matter of grave concern as it is directly related with issues of mining, deforestation, displacement, health, loss of livelihood resources, lives and livelihoods, etc. Though it is an issue that concerns every one, we don't know how to deal it. The issue involves many aspects - social, economical, cultural, scientific and other areas. Different governments are putting their effort to deal with it and coming with their own policies and action programmes. There are agreements and disagreements on many issues related to lives and livelihoods, culture, etc.

Today we are here - people from NGOs, civil society, government, policy makers, intellectuals, scientific community - to come together to share our views. We will learn from each other - what could be our role, how we could come together to address the issue.

(Excerpts from the welcome address by Mr. Sailesh Chakravarty, National Convenor, FCFC)

climate change roundtable process

The present Climate Change Roundtable is part of the current process of critical city based consultations in India- Delhi, Visakhapatnam, Mumbai, Bangalore, Chennai and Bhubaneswar between July, 08 and October, 08. It is to be culminated in a national level workshop at Visakhapatnam in first week of November, 08. However, the process will be on and two more roundtables will be organised by February, 09- one in Guwahati and the other in Jodhpur.

Orissa is rich in natural resources and that is precisely the reason for so much pressure on local community to sustain control over the livelihood resources and livelihood. The mainstream development that is going in Orissa is no way different than the other parts of India. The question is who is using these resources and at what cost and who suffers?

Disasters are taking place due to climatic change factors. We have no knowledge, whom to make accountable? Here, we have local scientists, local researchers to focus on the experience of the masses, their perception and vulnerability. We have to listen to the experience of the fishermen, forest dwellers, slum dwellers, dry-land farmers and other sections of the society. We have to explore the potential linkage with scientific knowledge and civil society response.

Background and the context of the regional roundtables

The impacts of climate change are predicted to affect India adversely. The implications for India are enormous with about 60% of our population who can be said to be marginalized. These communities live in various eco systems, and their livelihoods and life styles are rooted to their local environments. The impacts of climate change can be best understood from the perspective of the communities in various eco-systems: the forest dependent, the coastal, the urban, the arid and semi-arid regions and the mountainous zones. These communities are not the cause of the problem; but they will be the ones most vulnerable to its ill-effects.

The issue, therefore, is how to integrate the development needs with a reduction in emission levels in the atmosphere?

This implies that unless we adopt a model of development that takes into consideration the carrying capacity of the Earth we will not be able to address the climate issue.

It is in this context the civil society needs to participate in advocating a climate agenda that takes into account the development needs of the poor at one level, and yet ensures equity in response at the global level.

The meetings serve as an opportunity for dialogue in a way that could be collectively meaningful to influence decision making from a longer term perspective.

Objectives

- To provide an opportunity for sharing of information on climate change by various actors: researchers, NGOs, academicians, government departments in the region;
- To create possibilities of linkages between actors in the interests of communities impacted by climate change;
- To Participate in larger coalition processes that are taking place at national and international levels

(Based on excerpts from the brief on the roundtable process made Mr. Walter Mendoza, at Bhubaneswar roundtable and the background papers)

biref note on the Bhubaneswar roundtable and the organisers

Climate Change Roundtable organised at Bhubaneswar on 30th October 2008 was participated by 55 participants- academicians, experts, bureaucrats from Utkal University, Agricultural University, Indian Meteorology Regional Centre, Orissa Remote Sensing Application Centre; NGO representatives and activists from Jahrkhanda, West Bengal, Andhra Pradesh and Orissa; Community representatives from Orissa, media persons, etc.

The Roundtable was distributed over four sessions: i) setting the scene with objectives, brief on the Roundtable process and overview in relation to climate change in Orissa; ii) Causes and impact of climate change; iii) Community perceptions, alternatives and adaptations; iv). Critique on national action plan in context of the international negotiators and recommendation.

Ecological foot print and Carbon footprint

All of the resources which people use for their daily needs and activities come from somewhere, even if not from their immediate surroundings. Food, electricity, and other basic amenities for survival must be produced within the confines of nature, using raw natural resources. Based on this relationship between humanity and the biosphere, an ecological footprint is a measurement of the land area required to sustain a population of any size. Under prevailing technology, it measures the amount of arable land and aquatic resources that must be used to continuously sustain a population, based on its consumption levels at a given point in time. To the fullest extent possible, this measurement incorporates water and energy use, uses of land for infrastructure and different forms of agriculture, forests, and all other forms of energy and material "inputs" that people require in their day-to-day lives. It also accounts for the land area required for waste assimilation.

The Ecological Footprint has emerged as the world's premier measure of humanity's demand on nature. It measures how much land and water area a human population requires to produce the resource it consumes and to absorb its wastes, using prevailing technology. The Ecological Footprint is a resource accounting tool that measures how much biologically productive land and sea is used by a given population or activity, and compares this to how much land and sea is available. Productive land and sea areas support human demands for food, fiber, timber, energy, and space for infrastructure. These areas also absorb the waste products from the human economy. The Ecological Footprint measures the sum of these areas, wherever they physically occur on the planet. The Ecological Footprint is used widely as a management and communication tool by governments, businesses, educational institutions, and non-governmental organizations.

Conceived in 1990 by Mathis Wackernagel and William Rees at the University of British Columbia, the Ecological Footprint is now in wide use by scientists, businesses, governments, agencies, individuals, and institutions working to monitor ecological resource use and advance sustainable development.

Carbon footprint

The Carbon Footprint measures the amount of carbon emissions our lifestyle generates.

Agenda

Session I - 9.30 to 10.30

- Registration
- Welcome and sharing the aims and objectives of the consultation
  - Mr. Sailesh Chakravarty, National Convenor, FCFC
- Peoples' voices in the domestic and international climate change agenda - a brief on the process
  - Mr. Walter Mendoza, INECC
- An overview of climate change in Orissa
  - Mr. Sanjay Khatua, DHARA, Bhubaneswar
- About the day's programme
  - Mr. Santosh Patnaik, ODAF

Session - II - 10.30 - 1.30pm

Causes and Impact of Climate Change, Moderator - Prof. A. B. Mishra

- Climate change trend in Orissa - fluctuation in rainfall, changing weather pattern
  - Mr. S.C. Sahoo, Regional Director, Indian Meteorology, Regional Centre
- Climate change trends in Orissa - coastal floodplains and sea level rise
  - Dr. Gopal Krishna Panda, Prof. in Geography, Utkal University
- Land use and land cover mapping and measurements of atmospheric suspended particulate matter and sulphur dioxide concentration along with meteorological parameter and heat island study in Angul and Talcher areas
  - Prof. Nimai Das Mohanty, Scientist, ORSAC, Bhubaneswar
- Film Show - Power for Change
- Fossil fuel based development, contribution to the green house gas and climate change trend in Orissa
  - Prof. Madhumita Das, Department of Geology, Utkal University

1.30 - 2.15pm Lunch Break

Session -III- 2.15- 3.45pm

Community Perceptions and Alternatives, Moderator, Mr. Manoj Pradhan

- Community perception of climate change and impact
  - Mr. Arun Binayak, Jharkhand
  - Rani Lenka, Coastal area, Jagatsighpur district, Orissa
  - Mr. Bijay Swain, SPAR, Sunderbans, WB
- Alternative land use models with focus on rain-fed areas
  - Prof. Santanu Mohanty, Associate Professor, Soil Science, OUAT
- Sustainable development, Ecological balance and food chain
  - Prof. B.C. guru, Department of Zoology, Utkal University
- Decentralised Energy Options
  - Mr. Hanak Tading, IRDWSI
- Sustainable agriculture
  - Ms. Ronali Pradhan, CWS

3.45-4pm - Tea break

Session iv : 4 - 5.30

Discussion on National Action Plan and Recommendation, Moderator: Mr. Sanjay Khatua

- Climate change treaties, summits, negotiations-national and international perspective and critique of National Action Plan on Climate Change (NAPCC)
  - Mr. Water Mendoza, INNEC
- State preparedness to address the issue of climate change and the role of media-
  - Mr. Bibhuprasad Tripathy, Advocate
- Plenary and Recommendations
- Vote of thanks
  - Ms. Jijnaasaa Dash, ODAF

Report and Documentation:

Mr. Ananda Swain, DHARA, Mr. Siddharth Das, ODAF

organisations behind the climate change roundtable, Bhubaneswar

Indian Network on Ethics and Climate Change - INECC

INNEC is a network of individuals and organisation representatives who are concerned with the Climate Change issue, particularly with reference to the Indian situation. It was instituted in June 1996 although it has been in operation since 1993. INECC believes that Climate Change is a part of a large environmental crisis and addresses the basic issue of ecologically destructive development processes that have been globally pursued. The issue of Climate Change raises basic questions of social justice and has a direct bearing on development alternatives for the future.

ODAF

Orissa Development Action Forum (ODAF) is a network of 12 civil society organisations working in the State of Orissa, India. Its mission includes: to facilitate the process of empowerment of the poor and marginalised, especially the Adivasis, Dalits, and the Fisher folk communities towards establishment of their self governance, ownership and sustainable management of natural resources; influence the policies and programmes of the State as well as National and International organisations in favour of these communities; realization of human, socio-cultural and political rights; disaster preparedness and response; gender and social justice; quality of life with dignity and emphasis on people-centred sustainable development with a balance of ecology and economy.

DHARA*

DHARA (Socio-Eco-Cultural Research & Communication Syndicate), is a Bhubansewasr based civil society organisation relating with research, experimentation, communication and dissemination focused on traditional sustainable livelihood systems, climate change adaptations, local knowledge systems and perceptions, mangroves and coastal ecology

* in sense of internal continuity in time and space)

Forum of Collective Forms of Cooperation (FCFC)

FCFC is a Forum of Networks of NGOs who are supported by EED, a German Resource Agency. There are about 20 such Networks who are members of the FCFC. The FCFC has three regional centres - Eastern, Southern and Northern, headed by three Regional Convenors and a National Convenor having Secretariat in Kolkata. The Forum promotes and strengthens the practice of the value of collectiveness without intervening into the autonomy of the individual partners. It provides a platform for mutual dialogue, exchange and learning from the experience, insights and perspectives of each other.

climate change : Orissa overview

changing face of Orissa

scenario- I

- Orissa comprises of five percent of the India's landmass, with 36.71 million people it accounts for four percent of the population of the country.
- Two third of the area is comprised of hilly forests, it has coastline of 480 km.
- State's fresh water is one of the highest in the country - 11 percent of India's total surface water resource- 663,774 hectares.
- The brackish water areas of the State include the Chilika lagoon- 79,000 hectares, estuaries- 2, 79,000 hectares and backwaters- 8,100 hectares. Orissa has 3,678 inland fishing villages with a population of 751,356.
- Eighty one percent of the State's rainfall is received during the monsoon (June-September).
- Of the total families who own land, 82 percent are marginal farmers- possessing less than 1 ha of land or small farmers - one to two ha.
- Of the total cultivable lands of the State, 62 percent are rain-fed; irrigation potential has been created for about 39 percent of the lands.
- 47 percent families live below poverty line - earns an annual income less than Rs.11, 000.
- Per capita availability of cultivated land in Orissa declined from 0.39 ha. in the year 1950-51 to 0.14ha in 2000-01.
- Given this profile, most of the communities, still earn their livelihood based on the multiple products and services available in their ecological niches.

Greenhouse Effect, Climate Change

Greenhouse (Greenhouses are used to grow plants, especially in the winter. Greenhouses work by trapping heat from the sun. The glass panels of the greenhouse let in light but keep heat from escaping. This causes the greenhouse to heat up, and keeps the plants warm enough to live in the winter.) gases in the atmosphere behave much like the glass panes in a greenhouse. Sunlight enters the Earth's atmosphere, passing through the blanket of greenhouse gases. As it reaches the Earth's surface, land, water, and biosphere absorb the sunlight's energy. Once absorbed, this energy is sent back into the atmosphere. Some of the energy passes back into space, but much of it remains trapped in the atmosphere by the greenhouse gases, causing our world to heat up.

The greenhouse effect is the rise in temperature that the Earth experiences because certain gases in the atmosphere (water vapor, carbon dioxide, nitrous oxide, and methane, for example) trap energy from the sun. Without these gases, heat would escape back into space and Earth's average temperature would be about 15°C colder. But if the greenhouse effect becomes stronger, it could make the Earth warmer than usual. Even a little extra warming may cause problems for humans, plants, and animals.

scenario- II

mining and industrialisation

- Some 34 mining investment proposals from TNCs covering an area of 49,000 sq. km have been approved. Between 1993 and 2003, there was a phenomenal 278 percent growth in mining and quarrying- from Rs. 7,005 to 19,489 millions. Coal comprises 56 percent of the total value of the minerals produced.
- According to a study the greenhouse gas emission of the State is one percent of the Global emissions (Institute of Policy Studies), which points out that India's industries and the coal fired power stations would have emitted 164 million tons of carbon dioxide annually by end of this decade, or the equivalent of about three percent of the projected growth in manmade greenhouse gasses anticipated globally over the next decade.
- Appropriation of the livelihood resources due to mindless mining and industrial activities are increasingly becoming a matter of grave concern. To cite one example, the river Bramhani with a catchments area of 39,000sq. km and a length of 701 km is the second largest river of Orissa and one of the most polluted river of the State as well one of the most polluted 10 rivers of the country, thanks to the mining and industrialisation. About 40 years back Bramhani was life line to the farmers and fishermen of Anugul, Talcher, Jajpur and Bhadrakh districts - mining and industrial effluents have adversely affected the breeding and composition of species of fishes, turning fishermen in to daily wage labourers.
- Between 1990 and 200-01, output of minerals went up by 121 percent, but the number of workers directly employed fell by 20 percent. For every one ha of land mined, only 1.6 workers are employed.
- The districts of Orissa having most of the mines, such as Jajpur, Keonjhar, Dhenkanal, Anugul, Jharsuguda and Sundergarh, Mayurbhanja and Koraput also have the most of the marginal families - Adivasi and Dalits range from 29 to 62 percent (State average 38 per cent).

scenario- III

perceived impact of climate change

- Going by the recent changes in the weather pattern and impact felt by the local communities, some pockets of Orissa already mirror the changes induced by Global Warming (largely perceived).
- Intrusion of sea and shore erosion over the last four decades have been sharply increasing - many pockets in Rajnagar in Kendrapada, Astaranga and Puri in Puri district and pockets near to Gopalpur in Ganjam are badly affected.
- In case of Rajnagar in Kendrapada district, five villages along the bay of Bengal coast have already been washed away by the sea. The sea has advanced around 2.5 km inland in the last 40 years, observe the local residents. Over the past 25 years, this patch of the Orissa coastline has been witnessing significant rise in sea level. Several other villages in Orissa are likely to suffer the same fate.
- The local people feel the rising sea levels are a result of increasing sea temperature. Higher sea temperature is causing more cyclonic conditions and, as a result, rising sea levels, observe the elders of the region. ' Summer days are more now, and one can easily feel the warmer seawater. Our parents used to tell that when the temperature of the sea rises, cyclones happen', local residents reason out.
- " There is sharp increase in the number of low pressure areas in the Bay of Bengal. Just a decade ego it was not that frequent". During 2005, the Bay of Bengal witnessed 10 low-pressure phenomena, six of which were in the post-monsoon period of October- December. The local people believe that the increase in the number of low-pressure phenomena is aggravating coastal erosion in their villages.
- Scientists also corroborate to the observation made by the community. "This phenomena may well be the preliminary impact of global warming-induced sea level rise. Going by the simulated models of the impact of the climate change on the Indian coast, this is one of the most probable impacts," says Dr Murari Lal, a coordinating lead author of the Inter-governmental Panel on Climate Change (IPCC).
- For over a decade, Orissa has been teetering from one extreme weather condition to another: from heat weave to cyclone, from drought to flood. The State has been declared disaster affected for 95 years out of the last 105 years: floods have occurred for 50 years, droughts for 32 years. Since 1965, these calamities have not only become frequent, they are striking areas that have never experienced such conditions before.

- Floods: Between 1834 and 1926, floods occurred at an average interval of 3.84 years. Between 1961 and 2000, floods became an annual affair.
- Drought: During 1950s only three districts were drought prone. By the 1980s, the whole western Orissa, consisting of five districts, become drought prone. During the 1990s, 25 of the 30 districts became drought prone.
- Cyclone: During 1970s and 1980s only two severe cyclones hit the State. During 1990s, two severe cyclones hit the State and the number of cyclonic conditions rose. With 13 severe cyclones in the last 100years, Orissa is the worst affected State in India.
- Heat wave in 1998 killed around 2,200 people - most of the causalities were from coastal Orissa, a region known for its moderate climate. Since 1998, almost 3,000 people have died due to heatstroke.
- An average of 900,000 ha of agricultural production is lost every year due to disasters. Similarly, between 1980 and 2000, agriculture's contribution to the State GDP fell by 16%.
- Some of the predicted impacts include the following:
  - Frequent and prolonged floods.
  - Sea level rise and intrusion of salinity and stagnation. The coastal tracts of Orissa have an average height of 4-5 mtr above the mean sea level, with some areas as low as 3-2 mtr. above sea level. The deltaic tracts, moreover, are crisscrossed by numerous rivers and creeks with tidal effect up to 50 kilometers inland. A 0.5 mtr. rise in sea level, as is predicted for the coming century, will drastically hit the coastal tracts.
  - An increase in sea surface temperature will be accompanied by a corresponding increase in cyclone intensity. A possible increase in cyclone intensity of 10-20 percent against an increase in sea surface temperature of 2- 4 degree centigrade is likely to happen (Dr Lal, a coordinating lead author of the Inter-governmental Panel on Climate Change (IPCC).
  - Rise in temperature and erratic fluctuation in micro climate leading to drought and flood conditions both in coastal and hilly areas.

(Excerpts from the presentation by Mr. Sanjay Khatua, DHARA)

climate change: policy perspective and policy choices

Why India should be concerned with Climate Change?

- Vulnerability: 600 million people live below or just above the poverty line-coping mechanisms must be in place
- India is under a great deal of pressure from the international community
- India's emissions are rising
- India has a tremendous potential for use of renewable energy
- India can play a leadership role in pursuing a low carbon pathway

Emissions

Cumulative CO2 Emissions: 1850 - 2000 (top 15 emitters)

	% of World GHGs
United States	29.8
European Union (25)	27.2
Russia	8.3
Germany	7.5
China	7.3
United Kingdom	6.5
Japan	4.1
France	3.0
Ukraine	2.3
Canada	2.1
Poland	2.1
India	2.0
Italy	1.6
South Africa	1.2
Australia	1.1

Top 15 GHG Emitters, 2000

	% of World GHGs	Tons C equiv. Per capita
United States	20.6	6.8
China	14.0	2.8
European Union (25)	5.7	3.6
Russia	5.5	0.5
India	4.0	2.9
Japan	4.0	2.9
German	2.9	3.2
Brazil	2.5	1.3
Canada	2.1	6.3
United Kingdom	2.0	3.1
Italy	1.6	2.5
Korea (South)	1.6	3.1
Ukraine	1.6	2.9
Mexico	1.5	4.1
France	1.5	3.0

The politics

The United Nations Framework Convention on Climate Change (UNFCCC)

- 191 countries have ratified the Convention. It recognizes that the climate system is a shared resource
- It is a Framework for Intergovernmental efforts to gather and share information on greenhouse gas emissions, national policies and best practices
- Launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts
- Cooperate in preparing for adaptation to the impacts of climate change including the provision of financial and technological support to developing countries

The Kyoto Protocol

- It is a protocol to the United Nations Framework Convention on Climate Change
- The Kyoto Protocol is a legally binding agreement under which industrialised countries will reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990, calculated as an average over the five-year period of 2008-12
- The Kyoto Protocol entered into force on 16 February 2005

The CDM instrument to make it transition. But designed to fail

- Aim to get cheap emission reduction has led to projects which do little
- Designed for ineffective action - additional to policy - leads to nothing
- Designed for mutual self-interest between private sector; not in public interest
- Has become the 'Cheap', 'Convoluted', 'Corrupt' Development Mechanism

2007: High on rhetoric, low on action

- Need urgent action. We are running out of time. Need deep cuts: 50-80% over 1990 levels by 2050
- Kyoto agreed to small change - 7% cuts
- Even that failed. US and Australia walked out. EU emissions increased last year
- Pressure on China and India

Options, but..

- The South will do what North has done
  - Will first get rich; add to pollution; then invest in cleaning it up
  - Will cut forests and convert to agriculture and then depress the price of food

- A low-carbon growth strategy will cost money. The South will need to invest in efficiency, pollution control and protecting forests as forests
- This needs change in global framework

Radical approach needed

- Framework for cooperation:
  - Industrialised countries to take deep cuts (30% by 2020) minimum. US and Australia must join
  - Emerging rich and rest to participate, not by taking legally binding cuts but through a strategy to 'avoid' future emissions
- What is the framework for low-carbon growth strategy?

Key concerns for climate change

- Those who are contributing to climate stabilisation are most impacted by climate change
- People's voices missing in the debate on climate change
- International negotiations are far short of the urgency of the problem
- Nationally, we need to play a leadership role in positing a low carbon pathway
- Voice of the civil society is missing

Intergovernmental Pannel on Climate Change (IPCC)

Climate change is a very complex issue: policymakers need an objective source of information about the causes of climate change, its potential environmental and socio-economic consequences and the adaptation and mitigation options to respond to it. This is why World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988.

The IPCC was established to provide the decision-makers and others interested in climate change with an objective source of information about climate change. The IPCC does not conduct any research nor does it monitor climate related data or parameters. Its role is to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts and options for adaptation and mitigation.

The IPCC is a scientific intergovernmental body; its constituency is made of :

- The governments: the IPCC is open to all member countries of WMO and UNEP. Governments of participate in plenary Sessions of the IPCC where main decisions about the IPCC work programme are taken and reports are accepted, adopted and approved. They also participate the review of IPCC Reports.
- The scientists: hundreds of scientists all over the world contribute to the work of the IPCC as authors, contributors and reviewers.
- The people: as United Nations body, the IPCC work aims at the promotion of the United Nations human development goals

Energy scenario in Indian context

Current Trends

- India's energy consumption is increasing rapidly
- Increasing energy consumption in the industrial, transportation and domestic sectors: India's energy usage upwards at a rate faster than even China in the period 1980-2001 (India's consumption increased by 208% compared to China's 130%)
- India's per capita energy is low as 70% of India's population still lives in rural areas. Their growth and development needs will mean an exponential growth in demand for energy, even at basic sustenance levels

Challenges for India

- Can India play a leadership role in application of renewable energy for a sustainable path to development?
- India's approach to CDMs needs radical review
- India's approach to nuclear energy is questionable
- India's focus on equity in the international domain not matched nationally
- Need to address over consumptive lifestyles in India

Weather and Climate

Weather describes whatever is happening outdoors in a given place at a given time. Weather includes daily changes in precipitation, barometric pressure (also called air pressure or atmospheric pressure, is the pressure exerted by the weight of air over a given area of Earth's surface. This value is a function of how many molecules of air there are in a specific area, how fast those molecules are moving, and how often they collide. Barometric pressure is measured by an instrument called a barometer), temperature, and wind conditions in a given location.

Climate describes the total of all weather occurring over a period of years in a given place. This includes average weather conditions, regular weather sequences (like winter, spring, summer, and fall), and special weather events (like cyclones, tornadoes and floods).

India's stand on Climate change

- No mandatory GHG abatement measures post 2012: fears implications to growth and poverty alleviation efforts
- Argument based on equity and rights perspective in the International domain: India's "per capita GHG emissions will at no point exceed that of developed countries even as we pursue our development objectives."(NAPCC)
- Critical linkages between the consumption patterns of the rich which are directly responsible for the increase in the use of materials that cause GHGs
- India supports voluntary commitments: actions by GoI
- India supports CDM in its current form due to various market opportunities

National Action Plan on Climate Change

Eight National Missions - Eleventh Plan (until 2012) and Twelfth Plan 2012 - 2017:

- Solar
- Enhanced Energy Efficiency
- Sustainable Habitats
- Water
- Sustaining the Himalyan Ecosystem
- Green India
- Sustainable Agriculture
- Strategic Knowledge on Climate Change

National Solar Mission

- Includes solar - thermal power production, as well
- Says the usual things on renewable energy, focuses on other renewable and non-fossil options - nuclear, wind, and bio-mass
- No tough targets
- Not clear whether the mission is with Ministry of New & Renewable Energy (MNRE) or Department of Science & Technology (DST)!
- Dependent on Centralised system

National mission on sustainable habitats

- Energy conservation building code
- Recycling & Urban Waste Management Systems
- Urban Planning and Public Transports

- No focus on building materials, and alternative and low-cost construction from local materials

National water mission

- Enhanced Storage Capacities
- Large-scale multipurpose irrigation projects
- Reliance on Sprinklers and drip-irrigation
- Talks of inter-basin transfers

National mission for a green India

- Forests as sinks
- Forest cover from 23 % - 33%
- Guided by the State Forest Departments
- Public - private institutional arrangements to leverage funds
- Community only mentioned in Joint Forest Management

National Mission for sustainable agriculture

- Thermal resistant, extreme condition resistant crops
- Convergence of Traditional Knowledge & Practice, with information technology, geospatial technologies and bio-technology
- New credit and insurance mechanisms

National Mission on strategic knowledge

- Socio-economic impacts of Climate Change; including health, demography, migration patterns and livelihoods of coastal communities
- Climate change units in universities
- Private Sector initiatives for innovative technologies

National Action Plan on Climate Change: Critique

- This is a PR Document, vague wish-list
- It is a top-down approach, focus on mainstream business sectors
- Does not take account of the : 600 million poor ; urban poor, traditional fisher folk, pastoralists, and artisans, or farmers in drought prone and flood prone zones; peoples' traditional knowledge and practices
- It is business and development as usual
- No overarching vision

Approach to Climate Change

- Human problem: Need to have a people centred approach
- Eco systems perspective to climate change impacts
- Need to understand the needs of the people, the vulnerable people in every eco system: Forest, Coastal, Mountainous, Arid, Urban
- CC increases the vulnerability of the poor:
    - Threat to life from disaster
    - Physical displacement of the most vulnerable
    - Food Security: cereal production
    - Health

Challenges for Civil Society

- How can we play an effective advocacy role on behalf of the marginalised majority?
- How can we collaborate: academic community, scientists and social actors for effective action across sectors and disciplines which impacts the grassroots?
- How can we contribute to policy issues for a low carbon pathway: to combine the development goals with lower emissions?

Politics for future

- Cannot freeze global inequity
- Cannot survive climate change - rich or poor
- Climate is not about the failure of the market
- It is about our failure to make the markets work for public and common good
- It is about politics

(Excerpts from the presentation by Mr. Walter Mendoza, INNEC)

excerpts from other thematic presentations

I

changing pattern of vulnerability of natural hazards in Orissa with special reference to floods

Climatic hazards

- Annually >1 lakh people are affected from coastal districts
- Flood & Cyclone accounts for 93 % of population affected
- Orissa has recorded an average annual loss of Rs 924 million - 35% due to cyclones and 65% due to floods
- The trend of damage is increasing over the years, especially since 2000
- On an average, 23,500 houses are destroyed annually
- 580 human health due to climatic hazards

Flood

- Population affected: 7.6 million in 2003, 7.5 million in 2001, 6.2 million in 2006, 4.2 million in 2008 - greater percentage from coastal districts
- On an average 3 million people are affected due to Floods
- Incidence of flood and the population affected increasing, despite of preventive measures
- Extent of cultivated area affected is also increasing in 2008, about 4,770 sq.km cultivated area was affected
- 35,000 houses destroyed in 2001 (highest of 1998-2007) and 4 lakhs in 2008
- Average 8,073 houses destroyed annually, greater percentage from coastal & western districts
- Annual property loss - Rs 1,953 million, property loss in 2003 - Rs. 8,560 million
- Human casualty : 92 in 2006 , 91 in 2007 & 68 in 2008

Lightning

- Incidence of lightning events increasing.; average annual occurrence 130 highest number of incidences in 2006 (279)
- Human causality increasing - annual average human death - 205
- Highest causality in 2007 (351)

Cyclone

- Human death in 1999 Super-cyclone - 9,927, maximum death from Jagatsinghpur district (5,000)
- On an average 993 human causality due to cyclone
- Nearly 7 Lakh houses were destroyed due to the 1999 Super Cyclone
- Most of the houses destroyed were from coastal districts including Khurda and Cuttack
- Nearly 66,500 houses destroyed annually

Heat wave (1998-2007)

- Annual average human death - 238, highest human death was in 1998 (2042)
- Coastal & North Western districts show higher human death

Change in coastline

- Offshore Islands
- Offshore Bars and Spits
- Position of River Mouth
- Tidal Swamps and Mudflats
- Coastal Vegetation and Mangroves
- Erosion and Sedimentation
- Coastline Changes

Food for thought

- Disaster losses are increasing
- Despite of Structural Mitigation measures (dams & embankments, etc.) protected areas are coming under greater flood risk and more areas are becoming vulnerable
- Changing pattern of vulnerability: non-coastal districts are coming under high risk for floods
- Districts having high human development index are showing higher relative vulnerability
- There is a need to track the relationship between development policy and disaster risk
- There is scope to believe that the drive for growth and development is generating new disaster risks

(Excerpts from the Presentation by Prof.G. K. Panda, Dept. of Geography, Utkal University)

thematic presentation

II

agroforestry - tool for sustainable agricultural production in Orissa

- At present 29 percent of land in Orissa is already subjected to desertification
- Improper water use has subjected 24 per cent of irrigated land to salinity and water logging
- Increase in population has put further pressure on crop land
- Indications of stagnating and declining productivity of some arable farming systems - rice & wheat rotation in Indo-gangetic alluvial plains

  To maintain productivity and sustainability, introduction of Nitrogen Fixing Trees (NFT) & (MPT) Multi Purpose Trees in the existing farming systems under Agro-forestry approach is one of the many options.
- Trees modify the micro-climate through carbon sequestration, improve nutrient cycling through process such as litter dynamics, nutrient pumping, arding soil erosion and desertification, maintenance of biodiversity and soil fertility.
- It is a bioremedy tool to the severely inundated areas and also for the lands affected by secondary salinity.

Role of Agro-forestry

Productive roles - Five F's viz. food, fuel, fodder, fibre & fertilizer.

Service roles

- Soil moisture conservation
- Fertility improvement
- Water and wind erosion control
- Extending shade and shelter
- Control of weeds
- Live fence

Other Beneficial roles

- Bioremedy to counter Greenhouse effects
- Carbon sequestration (1ha. of forests can sequester 6.2 tons carbon annually)
- Ground water balance
- Recycling of sewage water and industrial effluents
- Reclamation of costal saline soils
- Sand dune stabilization
- Mine spoils rehabilitation
- Mitigate shifting cultivation

(Excerpts from the presentation by Dr. Santanu Mohanty, AICRP on Agro- forestry, Orissa University of Agriculture and Technology, Bhubaneswar)

Greenhouse Gases and Global Warming

While many greenhouse gases occur naturally and are needed to create the greenhouse effect that keeps the Earth warm enough to support life, human use of fossil fuels is the main source of excess greenhouse gases. By driving cars, using electricity from coal-fired power plants, or heating our homes with oil or natural gas, we release carbon dioxide and other heat-trapping gases into the atmosphere. Deforestation is another significant source of greenhouse gases, because fewer trees means less carbon dioxide conversion to oxygen.

During the 150 years of the industrial age, the atmospheric concentration of carbon dioxide has increased by 31 percent. Over the same period, the level of atmospheric methane has risen by 151 percent, mostly from agricultural activities such as raising cattle and growing rice.

As the concentration of greenhouse gases grows, more heat is trapped in the atmosphere and less escapes back into space. This increase in trapped heat changes the climate and alters weather patterns, which may hasten species extinction, influence the length of seasons, cause coastal flooding, and lead to more frequent and severe storms.

thematic presentation

III

impact of climate change on environment

- The Earth's climate is dynamic and always changing through a natural cycle
- The changes have been speeded up because of human activities
- Recent years have been the warmest since 1860, the year when regular instrumental records became available

Mass extinction in past

Devonian period

- About 439 mya, caused by drop of sea levels as an ice age caused glaciers to form, and then by rising sea levels as the glaciers melted
- About a quarter of all marine families were killed off, and about 60% of marine genera

Silurian Period

- About 364 mya, cause unknown, killed off about a quarter of marine families and over half of all marine genera

Permian period

The biggest of all mass extinctions, marked by high levels of greenhouse gases, including carbon dioxide, low levels of oxygen in the oceans and high levels of toxic gases, possibly caused by a volcanic event igniting a continental-size layer of coal, thus releasing carbon dioxide, or maybe it was a large meteor hitting Earth. Whatever the cause, it killed off between 75 and 95 percent of the Earth's species, including nearly all animals

Triassic Period

- About 199-214 mya, probably caused by massive lava eruptions from the rift causing the Atlantic Ocean to form. Volcanism associated with this event may have caused global warming resulting in the extinction of about 22% of marine species.

Cretaceous Period

- About 65 mya, probably caused by 6-mile-wide object (10 km) striking Earth at Mexico's Yucatan Peninsula, killed off dinosaurs, about 16% of marine families and nearly half of marine genera)

Causes of Climate change

Natural / geological

- Continental drift
- Volcanic eruption
- Ocean currents
- The Earth's tilt
- Comets and Meteorites

Humans causing the sixth Mass extinction on earth?'

- Rapid population growth
- Global warming
- Environmental degradation
- Human destruction of ecosystems
- Over-exploitation of species and natural resources
- Pollution

Himalayan pollution could impact monsoon cycle

- French researchers have shown that pollution from China, India, Nepal and Pakistan can reach altitudes of over 5,000 metres in the Himalayas, contributing to the warming of the atmosphere and potentially affecting the South-East Asian monsoon cycle.

- When pollutants such as vehicle fumes transported from the plains of Nepal and other Himalayan countries meet down-sloping cleaner air from the troposphere (the lowest portion of the Earth's atmosphere) aerosol particles are formed.

Vulnerability of Orissa coast to sea level rise

- Anthropogenic/ Socio-economic factors
- Coastal population depend upon coastal/marine resources
- The problem of fresh water is already acute
- Over extraction of ground water and saline intrusion
- Present sea level rise is 2.5mm per year
- Mean sea level rise by the end of the century - 59 cm

Climate change can be tackled

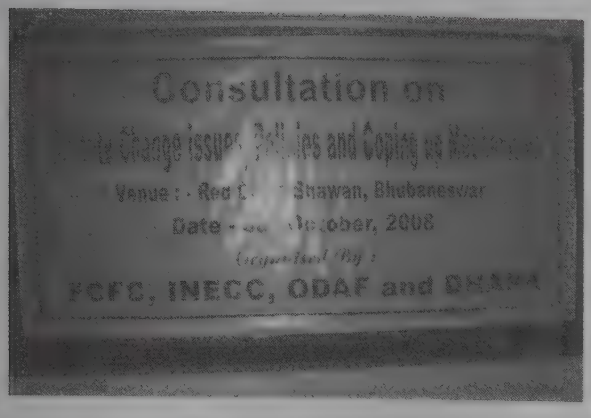
- India's science establishment needs to undertake more imaginative and investigative research if the challenge of climate change is to be met
- The establishment must take on more young and female scientists, whose "impatience and desperation" will strengthen India's - and the world's - climate science (Sunita Narain)

Response strategies and adaptation options

- Urgent need to make a systematic inventory of tidal gauge measurements and estuarine activities
- Regeneration of Natural protective measures like Mangroves, Coral reefs, Replenishment of Sandy beaches

(Excerpts from the presentation by Prof. Madhumita Das, Department of Geology, Utkal University, Bhubaneswar)

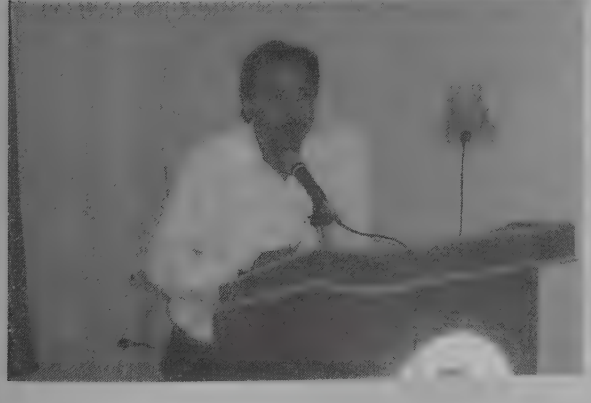
climate change roundtable - freeze frame



Setting the scene: Mr. Walter Mendoza, INNEC

Making a point: Mr. Sailesh Chakravarty, National Convenor, FCFC (front from L)& Dr. William Stanley, Convenor, CFC, ER

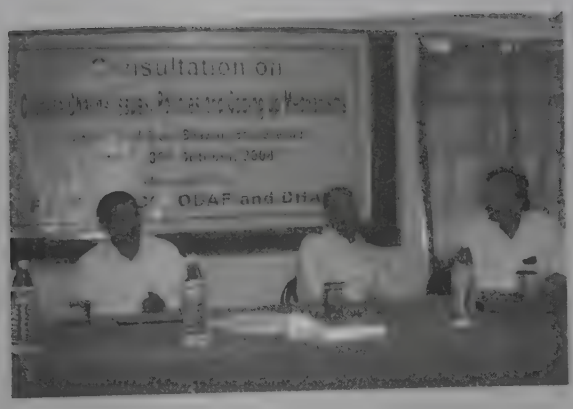
Climate change trends in Orissa: Mr S.C. Sahoo, Regional Director, Indian Meteorology, Regional Centre, Bhubaneswar



Climate Change trend in Orissa - increased vulnerability of coastal and inland areas: Prof. Gopal K. Panda, Dept. of Geography, Utkal University

Section of the participants

E-190 P63
II 31 II 1168



Mr. S.C. Sahoo, Director IMD-RC, Mr. Nimai Das Mohanty, scientist, ORSAC & Prof. G.K. Panda, Utkal University responding to participants

Climate change trends-past and present: Prof. Mrs. Madhumita Das, Dept. of Geology, Utkal University

Section of the participants

One of the participants putting across his view point and the moderators

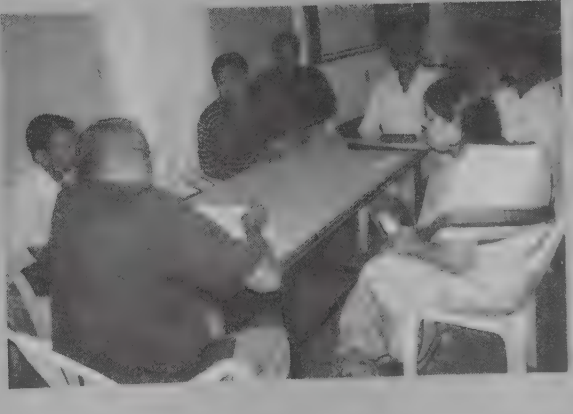
Mr. Arun Vinayak, PIDT Resource Centre , Jharkhand sharing his point of view

Climate Change and alternative land use models: Prof Shantanu Mohanty, Soil Science, Orissa University of Agriculture & Technology(OUAT)

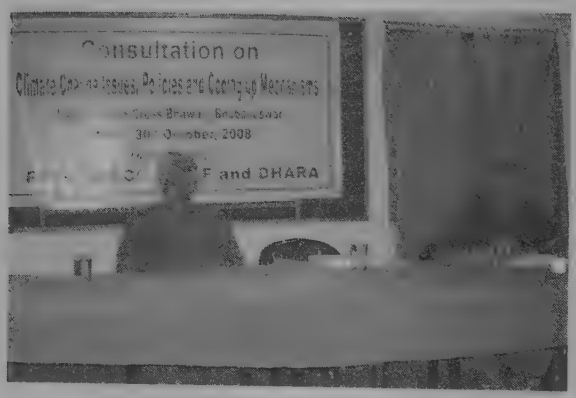
Climate Change, Ecological balance and sustainable development: Prof. B. C. Guru, Dept of Zoology, Utkal University

Climate Change, the State preparedness and media: Advocate Mr. Bibhuprasad Tripathy

Section of the participants and the buzz groups



View of the buzz groups and the group presentations



Global Warming

Global warming refers to an average increase in the Earth's temperature, which in turn causes changes in climate. A warmer Earth may lead to changes in rainfall patterns, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans. When scientists talk about the issue of climate change, their concern is about global warming caused by human activities.

Global warming is the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century and its projected continuation. Global surface temperature increased 0.74 ± 0.18 °C during the last century. The Intergovernmental Panel on Climate Change (IPCC) concludes that increasing greenhouse gas concentrations resulting from human activity such as fossil fuel burning and deforestation are responsible for most of the observed temperature increase since the middle of the 20th century. The IPCC also concludes that natural phenomena such as solar variation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward.

Climate model projections summarized in the latest IPCC report indicate that the global surface temperature will probably rise a further 1.1 to 6.4 °C during the twenty-first century. The uncertainty in this estimate arises from the use of models with differing sensitivity to greenhouse gas concentrations and the use of differing estimates of future greenhouse gas emissions. Some other uncertainties include how warming and related changes will vary from region to region around the globe. Most studies focus on the period up to the year 2100. However, warming is expected to continue beyond 2100 even if emissions stop, because of the large heat capacity of the oceans and the long lifetime of carbon dioxide in the atmosphere.

Increasing global temperature will cause sea levels to rise and will change the amount and pattern of precipitation, probably including expansion of subtropical deserts. The continuing retreat of glaciers, permafrost and sea ice is expected, with the Arctic region being particularly affected. Other likely effects include shrinkage of the Amazon rainforest and Boreal forests, increases in the intensity of extreme weather events, species extinctions, and changes in agricultural yields.

Political and public debate continues regarding what actions (if any) to take in response to global warming. The available options are mitigation to reduce further emissions; adaptation to reduce the damage caused by warming; and, more speculatively, gecengineering to reverse global warming. Most national governments have signed and ratified the Kyoto Protocol aimed at reducing greenhouse gas emissions.

IV

ecological imbalance and sustainable development

Biodiversity and Human being

- We frequently forget that we are a part of a great complex web of life and our existence depends on the integrity of 1.8 million species of plants and animals of the Earth
- We have exploited these plants and animals
- We have increased our population in an uncontrolled manner

Global population Growth

- We are 6 billion at present
- Likely to cross 7 billion by 2015
- The growth is:
  - 1 to 2 billion , in 123 years
  - 2 to 3 billion , in 33 years
  - 3 to 4 billion , in 14 years
  - 4 to 5 billion , in 13 years
  - 5 to 6 billion , in 11 years

Population in metros

Mega- cities in India	Population in millions	
	2001	2015
• Mumbai	16.5	22.6
• Kolkata	13.3	16.7
• Delhi	13.0	20.9

Global urbanisation

Mega cities - Over 10 million inhabitants

- In 1950, there was only 1, New York
- In 1975, there were 5

- In 2001, there were 15(With Mumbai, Kolkata and Delhi added to the list from India)
- By 2015, there will be 21 mega-cities

Cities over 1 million population

- In 2000, there were 388 cities with more than 1 million inhabitants
- By 2015, these will increase to 554, of which 75% will be in developing countries

Ecological footprint(EF)

- Ecological footprint corresponds to the land area necessary to supply natural resources to a community and disposal of its waste
- At present the average E.F of an individual at global level is 2.3 ha of land per capita
- But the world has only 1.7 ha of land per capita leading to an unsustainable land management

Sustainable development

- 'Sustainable development' is development that meets the needs of present without compromising the ability of the future generation to meet their needs
- Every generation should leave water, air, soil as pure and unpolluted

Components of sustainable development

- Economic development (Industrialisation, job opportunities and resource utilization)
- Community development (basic needs)
- Environmental protection

Planning for the future

- Limiting population size
- Protecting natural environment
- Changing consumer oriented attitudes
- Reducing waste
- Alleviating poverty
- Creating an effective balance between conservation and development

(Excerpts from presentation by Prof. B.C. Guru, Department of Zoology, Utkal University, Bhubaneswar)

V

measurements of atmospheric suspended particulate matter and sulphur dioxide concentrations in Talcher -Angul area

Major industrial units in Angul/Talcher

- Captive power plant
- Thermal power generation
- Smelter plant by NALCO
- Fertilizer Corporation of India
- Coal mines
- Dump sites

Conclusion and recommendations

It is observed and concluded that high concentrations of Suspended Particulate Matters (SPM) in different areas of Angul-Talcher are mainly due to present land use practices, particularly for extensive mining as well as industrial activities. Some of the mitigation measures are suggested below for environmental management of Angul-Talcher area.

- Abandoned mines areas may be filled and used for plantation.
- All dumpsites in the mining areas need to be planted with good forest canopy cover to the extent possible.
- Scrub forest areas can be developed for afforestation.
- All wastelands can be developed into a good forest canopy cover areas.
- Embankments of croplands (agricultural lands) can be grown with suitable species for plantation.
- Aerial photography study in scale 1:4,000 / CARTOSAT-2 Satellite data may be taken up/interpreted for the areas identified as mining areas so as to know the extent of existing plantations areas in order to suggest suitable areas for further plantations.
- Mathematical modeling for the area source may be developed to predict the concentrations at different sites so as to evolve an effective management strategy.

(Excerpts from the presentation by Mr. N.D. Mohanty, ORSAC, Bhubaneswar)

thematic presentation

VI

climate change with reference to temperature and rainfall in Orissa

Weather

- Daily fluctuating state of the atmosphere, characterised by temperature, wind, precipitation and other weather elements.

Climate

- Whether of the earth as a whole or of a single location, Climate is often described as the synthesis of prevailing weather recorded over a long period of time.

Climate change

- Refers to a significant variation in the mean climate state or its variability, persisting for an extended period.
- May be due to natural internal processes or external forcing, or due to persistent anthropogenic changes in the composition of the atmosphere or land use.

Location and climate change patterns

- Orissa in a coastal State on the east coast of India.
- Most of the Meteorological Hazards are experienced due to its geographical location and its position at the head of the Bay of Bengal.
- Extreme weather conditions are experienced: from Heat waves to Cyclones; from Droughts to Floods.
- In last one decade, natural calamities, which claimed 30,000 lives, have been more frequent as well striking areas that were never considered vulnerable.
- Fluctuating weather conditions suggest that it is reeling under climatic chaos.

Indicators of climate change

- Orissa is known for its moderate temperature but has been experiencing unprecedented rise in temperature over last one decade with the worst heat wave being in 1998, which killed around 2000 people in coastal Orissa.

- Experiencing severe drought (worst in 2001) - earlier drought free districts such as Kendrapara, Sundergarh are getting affected.
- Drought and Floods have now become annual feature with 2001 recorded as the worst flood year of Orissa in the past century.
- Frequency of cyclones have increased along Orissa coast. In 1999, two cyclones hit the coast in quick succession.
- Change in cropping/flowering patterns are noticed. Mango and Mahua trees reported of early flowering in some pockets. Since 2000, Mango & Mahua flowering has been reported in September and December respectively. Early flowering leads to low yield.

(Excertpts from the presentation of Dr. S. C. Sahu, Director, Meteorological Centre, Bhubaneswar)

thematic presentation

VII

adverse impacts of climate change : perception of local community (Sunderbans)

Features of Sundarbans

- Sundarbans is the largest contiguous mangroves ecosystem (along with Bangladesh) in the world.
- It has the largest mangroves diversity in the world including several threatened floral and faunal species
- The core area (Sunderbans National Park) has been designated as World Heritage Site
- Approximately 4 million people live in Sunderbans
- The community is fully dependent on the forest resources
- Agriculture is not properly developed yet due to many reasons
- Sunderbans is under severe stress and the community is quite vulnerable
- The Sunderbans consists of 102 islands, among them 48 are inhabited
- The population of the region is characterised by migrant settlers from different parts of Bangladesh and southern West Bengal for last 60 - 120 years
- At present four major types of livelihood activities are practiced: Agriculture, Fishery, Wood Collection and Honey Collection

Agriculture

- Approximately 65% of the total population is dependent on agriculture based economy
- Generally, single crop economy; in limited places double crops are practiced with rain water harvesting
- Paddy, Potato, Green Chili, Pumpkins etc. are the major crops
- The yield is good and farmers in some cases and successful in diversifying into various cash crops
- Lack of proper market linkages act as barrier for their economic realization - which in turn leads to poverty

Fishing

- Fishing activities are prevalent at various scales in the Sunderbans catering to livelihoods of greater percentage of the population. Nearly 42% population belonging to SC and ST are engaged in fishing. There has been a declining trend in volume of catch of economically important fish Hilsa since the 80s.
- While organised large scale fishing activity occurs in sea and deepwater small-scale fishing is done in the delta region (half of them are 'illegal')
- Micro-scale fishing is done in the shallow river bed - mainly to collect the baby prawns / shrimps - high short-term income with high risk factor (Crocodiles, Sharks)

Honey collection

- Approximately 3% of the total population involved
- Government has legalized and regulated the activity
- Due to low government rates compared to open market, people indulge in 'illegal' trade of honey
- High risk factor since honey collection is done within Royal Bengal Tiger habitat

Wood collection

Approximately 5% of the population is involved in the trade

- Most of them are 'illegal'
- A major environmental concern due to depletion in mangroves stocks
- Economic returns good compared to other livelihood options
- Risk factor high since collection is done from Tiger habitat

Local community perception about climate change

Temperature

- No major changes in recent past
- The span of summer season has increased
- Span of winter has decreased

Rainfall & Humidity

- Rainfall has considerably increased (one and half times more than what it was 15 years ago)

- The span of monsoon season has shifted (approximately it is now delayed by 15 - 20 days)
- The number of cloudy & humid summer days has increased

Sea Level Rise

- Villagers see definite changes in terms of sea level rise
- They have seen significant increase in the level of water during high tide (Bhara Kotal)
- Settlement of the new habitations and river siltation are major causes for flooding of rivers

Adverse effect of Climate change perceived by the community

- Intrusion of saline water into the agricultural land results in loss of yields
- Permanent intrusion causes loss of agricultural land and forces people to migrate (environmental refugees)
- Change in monsoon pattern causes severe stress on agriculture which is fully dependent on weather
- Increase in span of summer increases insect attack on crops
- The delayed winter hampers the cultivation of *Ravi* crop (winter crops)
- The intrusion of saline water causes severe stress on availability of drinking water
- Increasing humidity leads to incremental phenomenon of vector borne diseases

(Excerpts from SPAR presentation)

thematic presentation

VIII

climate change and agriculture

Green revolution and the collateral damage

- 'Agriculture has caused collateral damage to the Climate in several major ways and Climate Change in general is adversely affecting Agriculture. Input and Energy Intensive Agriculture i.e. Green Revolution and Green House Effect has contributed to Climate Change
- Hybrid/High Yielding seeds - designed to be more responsive to chemicals, meaning increased use of energy for manufacture and transport of chemicals, increased emissions of Green House Gases (GHGs) and deposition of heavy metal in water, occurrence of acid rain and so on
- Adverse Bio-physical consequences as a result of Climate Change have negative impacts on agriculture
- Impacts of Climate Change parameters relating to agriculture - high and low atmospheric temperature, high and erratic rainfall, wind velocity, high humidity

Sustainable Agriculture as an Alternative for Mitigating Climate Change

- Sustainable agriculture prevents use of synthetic chemicals
- Reduces direct and indirect energy use in agriculture
- Less emission of GHGs
- Livestock fed with organic grass releases less CH4 (Methane)
- Organic sustainable food production system reduces energy use

'Promotion of Sustainable Agriculture (SA)

- Centre for World Solidarity (CWS) is promoting SA in 5 States - 300 villages, 40,000 organic farmers involed in the networking process, about 2 lakh ha. of land covered
- Up scaling System of Ricae Intensification (SRI) - 1363 small and marginal farmers involved in 6 districts, network covers 612 acres paddy land in khariff of 2008. SRI principle is being planned to other cereals, millets and sugarcane; Methane (CH4) and Nitrogen Dioxide (NO2) emissions are comparatively less in SRI.

(Excerpts from presentation by Ms. Ronali Pradhan, Centre for World Solidarity)

National Action Plan on Climate Change in brief

On June 30, 2008, Prime Minister Manmohan Singh released India's first National Action Plan on Climate Change (NAPCC) outlining existing and future policies and programs addressing climate mitigation and adaptation. The plan identifies eight core "national missions" running through 2017.

Emphasizing the overriding priority of maintaining high economic growth rates to raise living standards, the plan "identifies measures that promote our development objectives while also yielding co-benefits for addressing climate change effectively." It says these national measures would be more successful with assistance from developed countries, and pledges that India's per capita greenhouse gas emissions "will at no point exceed that of developed countries even as we pursue our development objectives."

National Missions

National Solar Mission

The NAPCC aims to promote the development and use of solar energy for power generation and other uses with the ultimate objectives of making solar competitive with fossil-based energy options. The plan includes:

- Specific goals for increasing use of solar thermal technologies in urban areas, industry, and commercial establishment;
- A goal of increasing production of photovoltaic to 1000 MW/year; and
- A goal of deploying at least 1000 MW of solar thermal power generation.

Other objectives include the establishment of a solar research center, increased international collaboration on technology development, strengthening of domestic manufacturing capacity, and increased government funding and international support.

National Mission for enhanced Energy Efficiency

Current initiatives are expected to yield savings of 10,000 MW by 2012. Building on the Energy Conservation Act 2001, the plan recommends:

- Mandating specific energy consumption decreases in large energy-consuming industries, with a system for companies to trade energy-savings certificates;

- Energy incentives, including reduced taxes on energy-efficient appliances; and
- Financing for public-private partnerships to reduce energy consumption through demand-side management programs in the municipal, buildings and agricultural sectors.

National Mission on Sustainable Habitat

To promote energy efficiency as a core component of urban planning, the plan calls for:

- Extending the existing Energy Conservation Building Code;
- A greater emphasis on urban waste management and recycling, including power production from waste;
- Strengthening the enforcement of automotive fuel economy standards and using pricing measures to encourage the purchase of efficient vehicles; and
- Incentives for the use of public transportation.

National Water Mission

With water scarcity projected to worsen as a result of climate change, the plan sets a goal of a 20% improvement in water use efficiency through pricing and other measures.

National Mission for Sustaining the Himalayan Ecosystem

The plan aims to conserve biodiversity, forest cover, and other ecological values in the Himalayan region, where glaciers that are a major source of India's water supply are projected to recede as a result of global warming

Nation Mission for a 'Green India'

Goal include the afforestation of 6 million hectares of degraded forest lands and expanding forest cover from 23% to 33% of India's territory.

Nation Mission for Sustainable Agriculture

The plan aims to support climate adaptation in agriculture through the development of climate-resilient crops, expansion of weather insurance mechanisms, and agricultural practices.

National Mission on Strategic Knowledge for Climate Change

To gain a better understanding of climate science, impacts and challenges, the plan envisions a new Climate Science Research Fund, improved climate modeling, and increased international collaboration. It also encourage private sector initiatives to develop adaptation and mitigation technologies through venture capital funds.

Other Programs

The NAPCC also describes other ongoing initiatives, including:

- Power generation: The government is mandating the retirement of inefficient coal-fired power plants and supporting the research and developmentof IGCC and supercritical technologies.
- Renewable Energy: Under the Electricity Act 2003 and the National Tariff Policy 2006, the central and the state electricity regulatory commissions must purchase a certain percentage of grid-based power from renewable sources.
- Energy Efficiency: Under the Energy Conservation Act 2001, large energy - consuming industries are required to undertake energy audits and an energy labeling program for appliances has been introduced.

Implementation

Minister with lead responsibility for each of the mission are directed to develop objectives, implementation strategies, timelines, and monitoring and evaluation criteria, to be submitted to the Prime Minister's Council on Climate Change. The Council will also be responsible for periodically reviewing and reporting on each mission's progress. To be able to quantify progress, appropriate indicators and methodologies will be developed to assess both avoided emissions and adaptation benefits.

Blind Spots in India's new National Action Plan on Climate Change

Instead of having a strongly articulated, clearly thought through vision, India's new National action Plan on Climate Change has a basket of eight 'Missions' and no durable plan that will include the poorest and most vulnerable.

By Rahul Goswami

A policy that deals with a new set of circumstances and factors needs necessarily to think differently. Climate change is not population control, not rural unemployment. It needs to learn differently from the experiences of contemporary Indians.

Indian's new National action Plan on Climate Change (NAPCC), framed and presented by the Prime Minister's Council on Climate Change, displays little intent to learn differently. It desperately needed to, for climate change is not yet an emotive issue for the vast majority of Indians, whether those living in metros or Class 4 towns, whether marginal workers or IT professionals. Any policy that seeks to render convincingly into real life the hitherto abstract concerns of climate change must make communication and education a primary aim, Modern India has little time for abstractions that do not deal with inflation, the acquisitive instinct, or entertainment. The action plan, in failing to identify this observation, puts itself at a disadvantage from the outset.

Instead, it has chosen as its engine a set of eight 'missions'. Who is to ensure that these missions run synchronously? How will they integrate with each other? Will they be guided by ministers - for the eight inspirations seem to lie very much in the schemes and politically-motivated programs that punctuate every central administration - or will the reins be held directly by the Prime Minister's Council on Climate Change? The action plan provides no explanations.

Shape and scope of the climate change plan

India's National Action Plan on Climate Change (NAPCC) is divided into an 'Overview' section and a Technical Document.' The overview explains the Government of India's thinking on the country's economic development route, how climate change will affect that route, and what the responses could be. It states clearly: "India needs a national strategy to firstly, adapt to climate change and secondly, to further enhance the ecological sustainability of India's development path.'

The responses contained in the NAPCC are to be guided by a set of seven 'Principles' designed to "achieve a sustainable development path that simultaneously advances economic and environmental objectives." The document's very short 'Approach' speaks of "a directional shift" in India's development route "including through the enhancement of the current and planned programs". A number of these programs exist already under various ministry initiatives, while others are suggested in the NAPCC's 'Technical Document' which forms the bulk of the plan.

The core of the NAPCC consists of eight 'Missions'. The represent "multi-prolonged, long-term and integrated strategies for achieving key goals in the context of climate change". The plan makes the qualification that several of the programs contained in the missions are already part of current actions by several central ministries and departments. The missions are: National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustaining Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a Green India, National Mission for Sustainable Agriculture, and National Mission on Strategic Knowledge for Climate Change. Each mission will be tasked to evolve specific objectives spanning the remaining years of the Eleventh Plan (until 2012) and Twelfth Plan periods (2012-2017).

Mentioning that awareness-building is vital for implementation of the NAPCC, the 'Implementation' section of the document says that the plan administrators "will develop appropriate technologies to measure progress in actions being taken in terms of avoided emissions, wherever applicable, with reference to business-as-usual scenarios".

In the 'Institutional Arrangements' section of the plan document, the need for an advisory council on climate change, chaired by the prime minister, is explained. This council has "broad-based representation from key stakeholders, including government, industry and civil society and sets out broad directions for national actions in respect of climate change."

The 'Technical Document' of the NAPCC begins with a background on India's action plan and invokes the findings of the Fourth Assessment Report on the Intergovernmental Panel on Climate Change (IPCC). The section explains the imperatives for poverty alleviation, the relationship between the human development index and energy consumption, and also outlines some observed changes in climate and weather events in India and their impacts on key sectors such as agriculture. Actions for adaptation and mitigation are suggested, before the technical document sets out more detailed schema for the eight missions. These include current conditions, regulatory and policy environment, changes required in view of the NAPCC, financing and risk considerations, and awareness, outreach and capacity-building measures.

Approach' speaks of "a directional shift" in India's development route "including through the enhancement of the current and planned programs". A number of these programs exist already under various ministry initiatives, while others are suggested in the NAPCC's 'Technical Document' which forms the bulk of the plan.

Other Initiatives' occupies a large chunk of the remainder of the document, after the eight missions are explained. These initiatives explain the need for greenhouse gas (GHG) mitigation in power generation, for renewable energy technologies, for disaster management responses to extreme climate events, protection of coastal areas, and creating appropriate capacity at different levels of government.

Finally, a short section on the international dimension of climate change includes India's participation in the multilateral processes under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The section rounds off with a discussion on the Clean Development Mechanism (CDM) and its use in the Indian industrial environment.

Why is India's climate change direction deemed as best being served by missions whose descriptions contain no linkages? A critical reading of the action plan reveals that its assumptions area couched in a worryingly familiar framework - the same way that health, education and livelihoods never meet in any state's policy effort. Moreover, the plan assumes that individual mission objectives will be delivered with the inclusion of "public-private partnerships and civil society action". Again, this is an assumption that has been soundly disproved in the last three years by Indian society in every state that has seen revolts against the ruling economic ideology. How then can this council posit that such a combination will deliver long-term sustainability and help mitigate the impact of climate change in India?

CO^2 emissions from the consumption of fossil fuels
Top ten countries - (Million Metric Tons of Carbon Dioxide)

2005	1995	1985	Rank
USA	USA	USA	1
China	China	Former USSR	2
Russia	Russia	China	3
Japan	Japan	Japan	4
India	India	Germany, West	5
Germany	Germany	Britain	6
Canada	Canada	India	7
Britain	Britain	Canada	8
S Korea	Ukraine	Poland	9
Italy	Italy	France	10

Source: Energy Information Administration, US Department of Energy

The action plan contains - in its overview, principles, approach and mission summary sections - a good dose of the concerned international language of climate change recognition. The audience for such a language may exist in the contingents that throng G8 meetings, the World Economic Forum and global road shows to promote India's economic attractiveness, but they will remain incomprehensible to tens of millions in our towns and cities, our tehsils and our talukas. Who will take on the responsibility for its interpretation and translation? Will it be the 'strategic knowledge' mission? We are not told.

Amongst the 35 urban agglomerations and cities in India with populations of over 1 million are Allahabad, Amritsar, Asansol, Dhanbad, Faridabad, Jabalpur, Jamshedpur, Nashik, Rajkot and Vijayawada. How will the action plan reach the citizens of these cities? How will these cities' municipal corporations and councils be sensitized, trained, motivated and equipped to transmit the plan message to every city ward? Who will fund this massive national outreach without which India's climate change program will fail? Will it be city administrations state governments, or the central government? These concerns will immediately be felt by urban governance officials when the NAPCC gets into gear. But they are left unanswered in the plan.

Although the action plan is deficient on a number of counts, everyone agrees that a national action plan is of prime importance to an India that has wedded itself to the idea of 9% annual DP growth in the foreseeable future. But how are the urban poor to become rights-holders (not stakeholders) in a future that includes climate change mitigation and local sustainable development? Will the 8.2% of Vadodara's population that lives in the slums be heard and included? Will the 12.5% of Varanasi's; 15% of Jaipur's; the 19% of Delhi's; the 21% of Pune's; the 43.8% of Meerut's; and the 49% of Mumbai's population?

The NAPCC does not consider whether the urban poor will even be reached by renewable energy technologies. The plan will first have to deal with the country's established power bureaucracies - a difficult task - and the consequences of not doing so lie outside the concerns stated in the NAPCC. But it will still have an impact on India's climate change burden.

Consider the carbon footprint of the National Thermal Power Corporation - India's largest power company NTPC's annual emissions for 2006-07 are 168.7 million metric tonnes, a calculation recently publicized through reports in the Carbon Monitoring for Action (CARMA) database on the global power industry. The company has a total power-generation capacity of around 29,000 MW, of which 86% is coal-based -NTPC is the largest consumer of coal in India, needing 125 million tones to run its power plants. The company plans to add 21.941 MW of new generating capacity between now and 2012; of that, 15,180 MW will be through coal-fired plants and the rest from gas- - and water-based projects.

According to NTPC, it is "among the most efficient producers of power using fossil fuels, emitting only 800 grams of CO2 per kwh of electricity generation." Although power sector experts and independent emissions analysts may argue with this claim, it is as misleading as repeating that India's power sector emissions are only 6% of the USA's and just 25% of China's. The consideration that our per capita emissions will only increase, and that India's share of global emissions ill also only rise, must be central to our development direction and our commitment to finance clean technology and combat climate change. That commitment over the next few decades must be linked with today's truth - that, no matter how efficiently we burn coal, it can only lead to disaster.

E-190
11(81

In this report, 'Integrated Energy Policy', the Indian Planning Commission projects that electricity-generation in India in the next 25 years will increase up to eight times; that this will require an enormous rise in our use of coal (up to four times as much) and up to 10 times our current use of natural gas M V Ramana and Divya Badami Rao of Centre for Interdisciplinary Studies in Environment and Development, in Bangalore, warn in the Bulletin of the Atomic Scientists that such as energy direction will propel India's per capita emissions up to 3.6-5.5 tonnes of CO2 by 2030.

Personal transport in the absence of public transport options, residential use in fast-urbanizing settlement zones, and small to medium industry are some of the prominent challenge as for the NAPCC. Over the past decade, transport's greenhouse gas emissions have increased at a faster rate than any other energy-using sector. China, through a nationwide directive issued by the Ministry of Construction, in 2006, accords top priority to developing urban public transportation. India's National Urban Transport Policy 2006 calls upon the Indian states to focus on the mobility of people rather that of automobiles, and promote public transport in order to reduce fuel consumption and emissions, including emissions of greenhouse gases.

And there is a desperate need to. The IPCC predicts that the world's fastest increases in transport energy use will occur in developing countries. S Sundar and Chhavi Dhingra of The Energy and Resources Institute (TERI), New Delhi, point out that these countries, led by India and China, are projected to account for much of the future growth in oil consumption and GHG emissions due to their strong economic and population growth. The International Energy Agency's projections of annual CO2 growth rates for 2002-2030 range from 1.3% for the OECD nations to 3.6% for developing countries. According to the Asian Development Bank (ADB), China's energy use for transportation is projected to growth by 6-9% per year, while India's is expected to row at 5-8% a year between now and 2025. The ADB projects CO2 emissions from on-road transport in China and India to increase 3.4 times and 5.8 times respectively, over a 30-year period (2005-2035).

Yet, from the conventional more-GDP-is better point of view, India faces a funding shortfall of Rs.451,000 crore in reaching its target of adding 78,577 MW of power-generation capacity in 2007-12, which will require Rs.1.03 million crore by current estimates. Demand projections made in the 16th Electric Power Survey are seen as critical over 100,000 MW of additional generation capacity needs to be added by 212 to bridge the gap between demand and supply of power.

Public sector power generation - CO^2 emissions in million tones

	2006-07	2005-06	2004-05	2003-04	2002-03	2001-00
North	129.55	120.01	112.21	110	106.81	202.74
East	96.36	92.52	83.96	75.51	66.59	61.43
South	109.25	101.76	105.6	108.12	105.24	92.18
West	157.72	153.93	157.78	144.13	148.56	141.6
North-east	2.65	2.53	2.47	2.46	2.29	2.16
India	495.54	470.85	462.02	440.22	429.48	400.11

Source: Central Electricity Authority CO^2 baseline database

It is against that the NAPCC will face its sternest test, for the power bureaucracies (and their finance overlords) are strong. Consider how the Ministry of Power's 'Blueprint for Power Sector Development (2001) approaches the question of energy provision. The document is dated 2001 but is still used as justification for massive planned increases in the use of coal as a primary fuel: "The capacity addition targets of 6,400 MW through nuclear power and 10,700 MW through non-conventional resources have been accordingly fixed for the period up to 2012. The large coal reserves in the country provide a ready and economical resource and ensure energy security. Hence, coal has been identified as the mainstay fuel for power generation till 2012. Emphasis has been laid on setting up large pit head stations to avoid the high costs associated with transportation of high-ash-bearing Indian coal and overstraining the already stretched rail network."

What of industry, the largest consumer of commercial energy in India? This sector accounted for 42% of the country's total commercial energy during 2004-05, and for a third of its total CO^2 emissions. How have its responsibilities and duties been defined by the action plan? Only marginally, and even there with data and an outlook that predate the new industrial-services push of the last five years. "The CO^2 emissions from the industrial sector can be broadly categorized into two heads," says the plan, "process-related emissions, and emissions due to fuel combustion in industries. Of the total estimated 250 million tones of direct CO^2 emissions from industry in 1994, nearly 60% were counted for by energy use". What of the now? What of the forecasts beyond 2012 and post-Kyoto Protocol options? When a handful of industries are making their own assessments for such a future, the plan finds no need to. Why the glaring absence of supporting material even in the 'technical' part of the action plan?

It is a deficiency that runs through the entire document. There are worthy examples of elsewhere of national outreach, which this action plan could have referenced. Perhaps it did not because its genesis and construction have been hidden from the very people it professes to help - the citizen of India. Drafts expects from industrialized countries. There is no attempt made to situate an Indian approach to development within the constraints of a changing climate, of several important new policies, like the new environment policy, have been released to the public

with an invitation for suggestions, objections and comments. There have also been consultations during the framing of some of these policies, even if these were more cosmetic than sincere. The National Action Plan on Climate Change has, in contrast, emerged from behind a curtain of policymaking secrecy and we are given no information as to whether the opinions of a broader community of exerts, or of concerned citizens' groups, were south during its drafting.

In Cuba, hurricane and disaster risk reduction is t aught in schools and training is carried out for the entire population, every year. Important public awareness activities include linking research to policymaking, with an emphasis on getting research messages out to appropriate target groups, building the credibility of forecasts and improving their dissemination and use. The National Mission on Strategic Knowledge for Climate Change, the eight of the NAPCC's missions, contains a draft blueprint for national activity of a similar scope in India, with climate change as its deliverable. But the framework stops short at defining systems that will convert the blueprint into communication.

Where data is concerned, our neighbour China has in place a systematic observation network through which it monitors atmospheric composition, energy balance, water and carbon cycles, ecosystems, land use, and ice and snow cover. The country regularly submits real-time observation data and historical data records from national stations to the World Data centre for Meteorology. China's eastern provinces are arguably the most intense greenhouse gas emitters in the world. But the country also has an operational system of short-term climatic monitoring, prediction and assessment established in the Beijing Climate Centre, and urns regional cooperative climate programs with other Asian countries such as Iran, Nepal, Sri Lanka and Uzbekistan.

In its current form, India's new action plan has neither a South Asian outlook, nor an Asian concern, and certainly no global view. It says little of substance about the international deadlock in the climate arena and is coy about what it because such an attempt requires a forthright international approach to be outlined, if not explained through both policy and real politic. Thus, there is no call for the responsibilities of industrialized countries to exceed their existing commitments to the Kyoto protocol or a reiteration of targets.

The absence of a strongly articulated, clearly thought through vision that encompasses the global, regional national and local is precisely why we have been presented with a basked of eight missions and not a durable plan that will include the poorest and most vulnerable. The intention of the action plan is to "further enhance the ecological sustainability of India's development path". But it ignores the host of questions that are being raised every day about the relevance of environmental economic approaches to development challenges and poverty reduction.

There are references enough to "renewable energy technologies" in the action plan, and to "sustainable development". Without a lucid and accessible explanation of why such technologies and such practices must replace our conventional

approach, the NAPCC will stay an agenda that has no follow-through. In the early-2000s, Amulya K N Reddy, an energy economist, explained that "sustainable development is often given lip service by the country's spokesmen at international conferences, but within the country, there are no political and economic instruments for its implementation". He added: "Worse still, following some industrialized country interpretations, sustainable development is often equated with environmentally sound development, ignoring its equity and empowerment (self-reliance0 dimensions."

These are only a few of the large conceptual and communication gaps in the NAPCC. As long as they exist, how will the plan ever deliver "a directional shift in the development pathway"? After all, India produces 846,000 barrels of oil a day (2006 estimate) and consumes 2.63 million barrels a day. The analytical underpinnings of such a wide-ranging plan are incomplete, and as long as they remain so there is no scope for a genuinely indigenous and equitable Indian approach to re-framing development within the ambit of the changing global climate. The action plan fails to recognize - even though it refers to several earlier policies and regulations - that a sectoral and ministry-bound approach to the problem has, to date, ensured that climate change risks are kept out of national development policies.

This obstinacy limits the action plan, especially in areas where it needs to be most forthright. The plan warns that climatic vagaries constitute a palpable threat to agricultural productivity, crop yields, and farm-level agricultural revenues, but it does not assemble knowledge or recommendations for adaptation. The plan ignores concerns that exist at a level more basic than that of climate change: that nearly two-thirds of India's total cultivated area is drought-prone, and nearly 40 million hectares of land area are flood-prone. What will climate change do to agriculture in these zones? We are not told. We also know that a mean sea level rise of 46-59 cm has been projected along India's coast by the end f the century, with a 15% increase in the intensity of tropical cyclones. What will this mean for the 250 million people who live within 50 km of India's 7,500 kilometers of coast? What will it mean for our 3,638 fishing villages? We are not told. If there is to be a Version 2 of the NAPCC - consultative, far more representative of stressed communities, and with targets - it must follow immediately for India to respond meaningfully to climate change.

(Rahul Goswami is an independent journalist and researcher based in Goa)

The Conference of Parties (COP): From Rio to Copenhagen

From 3 to 14 June 1992 heads of state and representatives from 172 governments across the whole world met in Rio de Janeiro in Brazil. The background to the meeting was gloomy. Two years previously the UN's climate panel (IPCC - Intergovernmental Panel for Climate Change), in its first synthesis report, pointed out that there was a real risk that human activities - especially the consumption of coal, oil and gas - could affect the earth's environment to a hitherto unseen and potentially very serious extent. "The earth's future is in danger" was the message.

The conference in Rio - which officially was called the United Nations Conference on Environment and Development, but went under the name "Earth Summit" - was set up on the basis of this warning. It resulted in the first international agreement to limit emissions of greenhouse gases: the United Nations Framework Convention on Climate Change (UNFCCC).

The convention is a so-called framework convention. This means that it does not represent the last word on the fight against climate change. It is stated in the treaty that it is to be revised and expanded over time. Neither does it set any binding targets, but aims to get member countries to reduce their emissions in order to prevent dangerous anthropogenic interference with the Earth's climate system. The target was for emissions of greenhouse gases in 2000 not to exceed those in 1990.

More than 150 countries signed the climate convention at the Rio conference itself, and on 21 March 1994, the convention came into force after it had been ratified or approved by other means by at least 50 countries. It thereby became legally binding.

During the 1990s, it soon became clear that the UNFCCC convention in itself would not change developments towards bigger and bigger emissions of greenhouse gases. In 1997, the convention was therefore expanded to include the so-called Kyoto Protocol, which for the first time set a binding target for how much the industrialised countries should reduce their emissions. The protocol sets binding targets for the greenhouse gas emissions of 37 industrialised countries. A group of countries that have ratified the UNFCCC have not ratified the Kyoto Protocol. The most prominent of these is the USA.

The Kyoto Protocol sets targets for emissions from 2008 to 2012. At the 13th annual conference of member countries (COP13) in Bali it was decided to work towards a new agreement for the subsequent years. The plan - which is called the Bali Action Plan - aims towards a new agreement which is to be negotiated at the 15th annual conference - COP15 - in Copenhagen in 2009.

UN Framework Convention on Climate Change (UNFCCC) and Conference of Parties (COP)

In 1990, the United Nations General Assembly decided to start work on a climate change convention. The endeavours led to 154 countries signing the United Nations Framework Climate Change Convention (UNFCCC) at the UN Summit in Rio de Janeiro in 1992. Since then, 192 countries including the USA have ratified the convention.

The goals of the climate change convention are to stabilize the amount of greenhouse gases in the atmosphere at a level that prevents dangerous man-made climate changes - this stabilization must occur in such a way as to give ecosystems the opportunity to adapt naturally. This means that food safety must not be compromised, and that the potential to create sustainable social and economic development must not be endangered.

Each year, a Conference of the Parties is held, where the countries which have ratified the convention meet and discuss how the convention's goals can be implemented in practice. One of the tools, which the parties have agreed upon, is the Kyoto Protocol.

The climate change convention is administered by the United Nations Climate Change Secretariat in Bonn. The secretariat's tasks include monitoring the development in the individual countries' CO2 emissions, as well as keeping watch on which countries ratify the Kyoto Protocol.

COP: Conference of Parties

COP-1, Berlin 1995

The highlight of the first Conference of the Parties was the dilemma over how the individual countries would combat greenhouse gas emissions. The outcome was "The Berlin Mandate", which set a two-year analysis and evaluation phase. This phase was to result in a catalogue of instruments from which the member countries could choose and thereby compose a set of initiatives that matched their needs.

COP-2, Geneva 1996

The second Conference of the Parties endorsed the results of the IPCC's second assessment report, which came out in 1995. At this conference it was established that member countries would not pursue uniform solutions. Each country should have the freedom to find the solutions that were most relevant to its own situation. At the Geneva conference the parties also expressed a wish for binding targets to be defined in the medium-term future.

COP-3, Kyoto 1997

The Kyoto Protocol was adopted after intense negotiations. For the first time the protocol introduced binding targets for greenhouse gas emissions in 37 industrialise countries from 2008 to 2012. Subsequently there were several years of uncertainty as to whether a sufficient number of countries would ratify the treaty, but on 16

February 2005 it came into force. Several of the member countries of the UNFCCC have not ratified the Kyoto Protocol and do not acknowledge its requirements regarding emissions

COP-4, Buenos Aires 1998

At this conference it became clear that there were several outstanding questions regarding the Kyoto Protocol. A two-year period was therefore scheduled to clarify and develop tools for implementing the Kyoto Protocol.

COP-5, Bonn 1999

This conference was dominated by technical discussions concerning mechanisms under the Kyoto Protocol.

COP-6, The Hague 2000

This conference was quickly marked by vehement political discussions concerning a proposal from the USA to let agricultural and forest areas be included as carbon sinks. If the proposal had been passed, it would at the same time have largely fulfilled the USA's obligation to reduce its emissions of greenhouse gases. It also became clear that there was uncertainty as to which opportunities for sanctions should be adopted for the countries that did not live up to their obligations to reduce emissions. The meeting ended when the EU countries refused a compromise proposal, and the negotiations in reality broke down. It was agreed that negotiations would be resumed at an extraordinary conference in July 2001.

COP-6, Bonn 2001

When the parties met again about six months after the breakdown in negotiations in The Hague, expectations of a result were not high. In the meantime the USA - under its new President Bush - had definitively rejected the Kyoto Protocol and accordingly only took part in negotiations about the protocol as an observer. Despite the low level of expectations, agreement was reached on several significant questions. These included the extent to which forests and other carbon sinks could be included in countries' budgets for greenhouse gas emissions; the principles for sanctions relating to countries that did not meet their targets, and the flexible mechanisms that in different ways enabled reduction obligations to be moved between countries in return for financial compensation.

COP-7, Marrakesh 2001

Later in 2001, the parties met again for the regular annual conference. Here negotiations concerning the Kyoto Protocol were (almost) completed. The results were gathered in the documents called the Marrakesh Accords.

COP-8, Delhi 2002

At this conference the EU countries (under Danish chairmanship) tried unsuccessfully to get a declaration passed which called for more action from the parties under the UNFCCC

COP-9, Milan 2003

The focus of this conference was to clear up some of the last technical details concerning the Kyoto Protocol.

COP-10, Buenos Aires 2004

At this meeting the countries gradually began to open discussions as to what would happen when the Kyoto Protocol expired in 2012. The technical discussions still took up a lot of time.

COP-11/CMP-1, Montreal 2005

This conference was the first one to take place after the Kyoto Protocol had come into force. Accordingly the annual meeting between the parties to the UNFCCC (COP) was supplemented by the annual conference between the parties to the Kyoto Protocol (CMP or COP/MOP). The countries that had ratified the UNFCCC but not accepted the Kyoto Protocol had observer status at the latter conference. The focus of both conferences was what should happen after the expiry of the Kyoto Protocol in 2012.

CMP/MOP- Conference of the Parties serving as the Meeting of the Parties to the Protocol

COP-12/CMP-2, Nairobi 2006

Here the last remaining technical questions regarding the Kyoto Protocol were finally answered. The work involved in reaching a new agreement for the period after Kyoto continued, and a series of milestones were established in the process towards a new agreement.

COP-13/CMP-3, Bali 2007

The thirteenth COP conference in Bali in Indonesia took place shortly after the UN's climate panel, the IPCC, had published its fourth large synthesis report on the state of the climate. The conclusions in the fourth report were clearer than in any of the previous reports from the IPCC. The signs of global warming were unambiguous, and the IPCC could state with more than 90 per cent certainty that anthropogenic greenhouse gas emissions were the primary cause of this. The panel could, with differing degrees of probability, point out consequences such as further rises in temperature, rises in the sea level, heat waves and droughts, flooding, the destruction of ecosystems and the lack of drinking water, among other things.

The COP-13 conference detailed its conclusions in the document which became known as the Bali Action Plan - also called the Bali Road Map. The plan acknowledges that the signs of warming are unambiguous, and that delays in our efforts to limit the emissions of greenhouse gases will increase the risk of the consequences being even worse. Accordingly it recommends that the speed of the work being carried out to limit the q uantity of greenhouse gases in the atmosphere

is increased. It also adopts an ambitious plan to reach a global long-term agreement, which is to replace the Kyoto Protocol when it expires in 2012. The Bali Action Plan aims to reach this agreement at the CO15 conference in Copenhagen in December 2009.

In order to support this plan the parties agreed to set up an ad hoc working group, which immediately began to clarify the possibilities of a new long-term cooperation within the framework defined by the UNFCCC. This "Ad Hoc Working Group on Long-term Cooperative Action under the Convention" (AWG-LCA) met for the first time from 31 March to 4 April 2008 and continues to meet several times a year. The working group works with a whole range of subjects, from a definition of what the long-term goal of the cooperation should be to the technical details of such things as financing. The working group is to present its results at the COP-15 conference in Copenhagen in November-December 2009.

At this meeting the work involved in reaching a new agreement to replace the Kyoto Protocol took a decisive step forward. First with the acknowledgement of the most recent report from the IPCC and its conclusions that the signs of global warming were unambiguous; second by formulating a common text calling for quicker action in this area, and finally with the adoption of the Bali Action Plan. This plan sets the scene for the negotiations leading to COP-15 in Copenhagen, where a new agreement can hopefully be negotiated.

COP-14/CMP-4 Poznan 2008

At this conference the work towards a new global climate agreement in Copenhagen continued. The upcoming change of power in Washington set its mark on the conference that was characterised by anticipation for the stance to be adopted by new American government. Still the parties reached an agreement on the work programme and meeting plan towards the Copenhagen conference and on the final operationalisation of the Adaptation Fund that will support concrete adaptation measures in the least developed countries.

COP-15, Copenhagen 2009

The annual conferences of the countries behind the UNFCCC and those behind the Kyoto Protocol are some of the largest international political conferences to be held. As climate has gradually worked its way up the international political agenda, the annual Conference of the Parties has become one of the most important focal points for international politics.

This means that when the parties meet in Copenhagen from 7 December to 18 December 2009, it is also the culmination of a series of intense negotiations in UNFCCC sub-agencies and a range of other places. In 2008 the UNFCCC has hosted more than 40 working meetings, conferences and other gatherings. In addition there is the practical work in the Bureau and a succession of negotiations and meetings between the individual member countries or groups of member countries

Even though there is agreement among the parties behind the UNFCCC that a "shared vision" should be drawn up for how climate change is to be tackled, there is still disagreement as to what this vision is to contain.

For example, there is discussion about the extent to which one should supplement long-term targets for reductions with short and medium-term targets. Ambitious long-term targets, which for example extend several decades into the future, risk becoming a pretext for inaction in the intervening years, and this will be contrary to the ambitions of the Bali Action Plan, which are to speed up the conversion process towards a more sustainable future.

The question of technology transfer and financial help for developing countries also take up a significant part of the discussions.

A more concrete question that is expected to be of significance in the process up to COP-15 and at the conference itself is how one is to approach forests. The felling of forests strengthens the greenhouse effect, so in principle an initiative either against felling or in support of the planting of more forests should have a positive effect on the quantity of greenhouse gases in the atmosphere. The conservation of forests is not at present one of the possible projects for a Clean Development Mechanism, but with pressure increasing on the world's remaining forests, there are groups that argue that it should be included.

Another concrete discussion item is how one should deal with the relocation of companies with high levels of energy consumption to developing countries, which are not subject to requirements concerning reductions in greenhouse gas emissions. The cement industry is the most pressing example, as it uses very large quantities of energy.

Developments in the world since the Kyoto Protocol was negotiated in 1997 show that a new agreement is needed. China has replaced the USA as the largest emitter of greenhouse gases, and the price of oil has soared. This is a reminder of the fact that fossil fuels do not merely pollute; they are also a source of energy whose reserves are constantly being reduced.

It is expected that COP-15 conference in Copenhagen will result in an ambitious global agreement incorporating all the countries of the world.

At the time of the adoption of the Bali Action Plan, the Danish, Polish and Indonesian governments agreed to strive to ensure that the COP-15 conference in Copenhagen in 2009 would be absolutely crucial for the work of the next many years towards a better climate. The background to this decision was partly the increased focus on quick action in the latest report from the IPCC. It was also partly an acknowledgement of the fact that 2009 represents more or less the last chance to achieve an agreement, if this agreement is to be approved and ratified in time for it to come into force after the Kyoto Protocol expires in 2012.

Adapted from materials from http://en.cop15.dk/

List of the participants

Climate Change Roundtable Bhubaneswar / 30 October, 2008

SL.NO.	NAME	ORGANISATION
1	Mr. Rabindra Nath Mohanty	TSRD
2	Mr. Sukanta Mohanty	CReNIEO
3	Mr. Mihir Kundu	PIDT- Jharkhand Resource Unit
4	Mr. K.Murli	Unit Manager, AFPRO, Bhubaneswar
5	Mr. Karikor K.	AFPRO
6	Mr. S.K.Parija	Seva Bharati
7	Mr. Sanjay Khatua	DHARA
8	Mr. Hanak Tading	WIDA
9	Mr. Narendra Majhi	WORLP
10	Mr. Anand Swain	DHARA
11	Mr. Walter Mendoza	INECC
12	Mr. Sailesh Chakravarty	FCFC
13	Mr. Kumud Behera	SVK
14	Mr. Rezaul Karim	SPAR
15	Mr. Amar Kumar Gouda	RCDC
16	Mr. Dhananjay Batbyal	SEDP
17	Ms. Jijnaasaa Dash	ODAF
18	Mr. Arun Vinayak	JUDAV, Jharkhand
19	Mr. Arttabandhu Mishra	Jyoti Vihar, Burla
20	Mr. S.C.Sahu	Indian Meteorology Dept , Bhubaneswar
21	Prof. Mrs.M.Das	Dept. of Geology, Utkal University
22	Prof. B.C.Guru	Dept. of Zoology, Utkal University
23	Mr. Santosh Kumar Patnaik	ODAF
24	Prof. G.K.Parida	Dept. Geography, Utkal University
25	Mr. Himansu Patra	VASUNDHARA
26	Mr. Ajay Mohanty	Seva Bharati
27	Mr. Bhusan Benya	RAD
28	Mr. Manoj Pradhan	CPSW
29	Mr. Manas Ranjan Acharya	OSPSP
30	Mr. Nimai Das Mohanty	ORSAC
31	Mr. Vijay Kumar Swain	SPAR
32	Mr. Bipin Bihari Barik	AGRAGAMEE
33	Mr. Sujit Patnaik	IMS
34	Mr. Dipti Ranjan Behera	IMS
35	Mr. Radhamadhab	OTV
36	Mr. William Stanley	ODAF/ INECC
37	Ms. Debyani Samantaray	OTV
38	Mr. Ramali Prdhan	CWS
39	Mr. Madhab Behera	ANUPAM BHARAT
40	Mr. Bimal Prasad Panda	MASS
41	Mr. Somnath Pattnaik	PEOPLES WATER
42	Ms. Runu Lenka	PEOPLES WATER
43	Mr. Satya Sundar Barik	THE HINDU
44	Mr. Nangai Murmu	ACM
45	Mr. Abinash Das	Peoples Progressive Initiative
46	Ms. Lipika Verma	ODAF
47	Mr. Sankarsana Hota	PIPAR
48	Mr. Bibhu Prasad Tripathy	Advocate
49	Mr. Kishore Kumar Patnaik	ODAF
50	Mr. Prempatra Jani	WIDA
51	Dr. S.Mohanty	Associate Prof.,OUAT
52	Mr. Sidhartha Das	ODAF

"When you warn people about the dangers of climate change, they call you a saint. When you explain what needs to be done to stop it, they call you a communist.....The crisis we face demands a profound philosophical discussion, a reappraisal of who we are and what progress means. Debating these matters makes us neither saints nor communists; it shows only that we have understood the science."

George Monbiot , in an article published in The Guardian/UK, December 4, 2007. *George Monbiot* is the author of the best selling books *The Age of Consent: a manifesto for a new world order and Captive State: the corporate takeover of Britain*. He writes a weekly column for the Guardian newspaper.

The United Nations Climate Change Conference
Poznañ, Poland
1-12 December 2008

- The Poznañ Climate Change Conference provides the opportunity to draw together the advances made in 2008 and move from discussion to negotiation mode in 2009. Such an outcome at Poznañ would build momentum towards an agreed outcome at Copenhagen. At COP 14/CMP 4 in Poznañ, Parties are expected to:
- Agree on a plan of action and programmes of work for the final year of negotiations after a year of comprehensive and extensive discussions on crucial issues relating to future commitments, actions and cooperation
- Make significant progress on a number of on-going issues required to enhance further the implementation of the Convention and the Kyoto Protocol
- Advance understanding and commonality of views on "shared vision" for a new climate change regime
- Strengthen momentum and commitment to the process and the agreed timeline

Important continuing issues will be capacity-building for developing countries, reducing emissions from deforestation (REDD), technology transfer and adaptation.

Two working groups will meet at Poznañ:

The Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA) will deal with adaptation, mitigation, technology, financing and the shared vision for a new climate change regime. Within the context of this working group, in-session workshops will deal in depth with the issue of risk management and risk reduction strategies, and the shared vision. Parties will discuss in detail proposals put forward on the future financial architecture of the agreed outcome at Copenhagen, along with technology and capacity-building.

The Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) is scheduled to finish deliberations on the possible means to achieve mitigation objectives for developed countries, before moving on to consider ranges of emission reduction objectives of Annex I Parties.

The Second Review of the Kyoto Protocol under its Article 9 will also take place at Pozna?. Article 9 requires a periodic review of the treaty in the light of the best available scientific information on climate change and its impacts, as well as relevant technical, social and economic information. Among the elements identified for review are issues related to the scope and effectiveness of the flexible mechanisms, including the capacity of Parties to participate in the Clean Development Mechanism (CDM).

Published by:
FCFC & ODAF
NA-204, Neelachakra Apartments
Bhubeneswar- 751006

devised by: dhararcs@rediffmail.com